

The Claims

What is claimed:

1. A suspension system for a backpack, comprising:
5 a rocker arm pivotally connected to the backpack, the rocker arm having a first end and a second end;
a first hip stay having a first end connected to the first end of the rocker arm and a second end opposite the first end;
a second hip stay having a first end connected to the second end of the rocker
10 arm and a second end opposite the first end; and
a waist belt attached to the second end of the first hip stay and to the second end of the second hip stay.
2. The suspension system of claim 1, wherein the first end of the first hip stay is
15 flexibly connected to the first end of the rocker arm, and the first end of the second hip stay is flexibly connected to the second end of the rocker arm.
3. The suspension system of claim 2, wherein the first end of the first hip stay is flexibly connected to the first end of the rocker arm by a first resilient member, and the first
20 end of the second hip stay is flexibly connected to the second end of the rocker arm by a second resilient member.
4. The suspension system of claim 1, wherein the first end of the first hip stay is substantially rigidly connected to the first end of the rocker arm, and the first end of the
25 second hip stay is substantially rigidly connected to the second end of the rocker arm.
5. The suspension system of claim 1, wherein:
the second end of the first hip stay is attached to the waist belt at a first point;
and
30 the second end of the second hip stay is attached to the waist belt at a second point;
wherein the first and second points are substantially adjacent opposite sides of a wearer's hips.

6. The suspension system of claim 5, wherein the backpack presents a downward force, and the first and second hip stays concentrate the downward force within a central region of a wearer's skeletal frame.

5 7. The suspension system of claim 1, further comprising a mounting plate, wherein the rocker arm is pivotally connected to the mounting plate.

8. The suspension system of claim 7, further comprising a tail stay extending from the mounting plate to the waist belt intermediate the first hip stay and the second hip stay, wherein the tail stay stabilizes movement between the backpack and the waist belt.

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9. The suspension system of claim 8, wherein the tail stay is substantially a zero-force member.

15 10. The suspension system of claim 8, further comprising a shoulder harness associated with the backpack and spaced a vertical distance from the waist belt, wherein the tail stay is slidably attached to the waist belt to allow the vertical distance between the shoulder harness and the waist belt to increase or decrease to compensate for changes in length of a wearer's spine during bending movements.

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11. The suspension system of claim 1, wherein a load is dynamically transferred from the backpack to the waist belt through the first and second hip stays.

12. The suspension system of claim 1, wherein the rocker arm is pivotable about a pivot point located intermediate the first and second ends of the rocker arm.

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13. A suspension system for a backpack, comprising:
a mounting plate;
a first hip stay having a first end connected to the mounting plate and a
second end opposite the first end;
a second hip stay having a first end connected to the mounting plate and a
second end opposite the first end; and
a waist belt attached to the second end of the first hip stay at a first point, and
connected to the second end of the second hip stay at a second point;

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wherein the first and second hip stays are contoured such that the first and second points are substantially adjacent sides of a wearer's hips.

14. The suspension system of claim 13, wherein the first and second hip stays
5 concentrate a downward force of the backpack within a central region of a wearer's skeletal frame.

15. The suspension system of claim 13, further comprising a rocker arm
pivotally connected to the mounting plate and having first and second ends, wherein the first
10 end of the first hip stay is connected to the first end of the rocker arm and the first end of the second hip stay is connected to the second end of the rocker arm.

16. The suspension system of claim 15, wherein the first end of the first hip stay
is flexibly connected to the first end of the rocker arm, and the first end of the second hip
15 stay is flexibly connected to the second end of the rocker arm.

17. The suspension system of claim 15, wherein the first end of the first hip stay
is substantially rigidly connected to the first end of the rocker arm, and the first end of the
second hip stay is substantially rigidly connected to the second end of the rocker arm.
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18. The suspension system of claim 13, further comprising a shoulder harness
associated with the backpack.

19. A backpack comprising:
25 a pack bag for carrying a load;
a mounting plate associated with a portion of the pack bag;
a rocker arm pivotally connected to the mounting plate, the rocker arm
having a first end and a second end;
a first hip stay connected to the first end of the rocker arm;
30 a second hip stay connected to the second end of the rocker arm; and
a waist belt connected to the first hip stay at a first point and to the second
hip stay at a second point;
wherein the load is transferred to the waist belt through at least the first and
second hip stays.

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20. The backpack of claim 19, wherein the first and second hip stays allow the waist belt to pivot with respect to the mounting plate.

5 21. The backpack of claim 19, wherein the first and second hip stays distribute the load between a wearer's left hip and a wearer's right hip.

22. The backpack of claim 19, wherein the first and second hip stays equally distribute the load between the wearer's left hip and the wearer's right hip.

10 23. The backpack of claim 19, further comprising a shoulder harness.

24. A backpack comprising:
a pack bag for carrying a load;
a shoulder harness associated with an upper portion of the pack bag;
15 a first hip stay having a first end connected to the pack bag and a second end opposite the first end;
a second hip stay having a first end connected to the pack bag and a second end opposite the first end; and
a waist belt associated with the second end of the first hip stay and the
20 second end of the second hip stay and spaced a vertical distance from the shoulder harness, wherein the waist belt is movable with respect to the first and second hip stays such that the vertical distance between the shoulder harness and the waist belt varies to compensate for shortening or lengthening of the wearer's spine during bending movements.

25 25. The backpack of claim 24, wherein the waist belt is slidably connected to the second end of the first hip stay and the second end of the second hip stay.

26. The backpack of claim 25, wherein the waist belt defines a first pocket for receiving the second end of the first hip stay and a second pocket for receiving the second
30 end of the second hip stay.